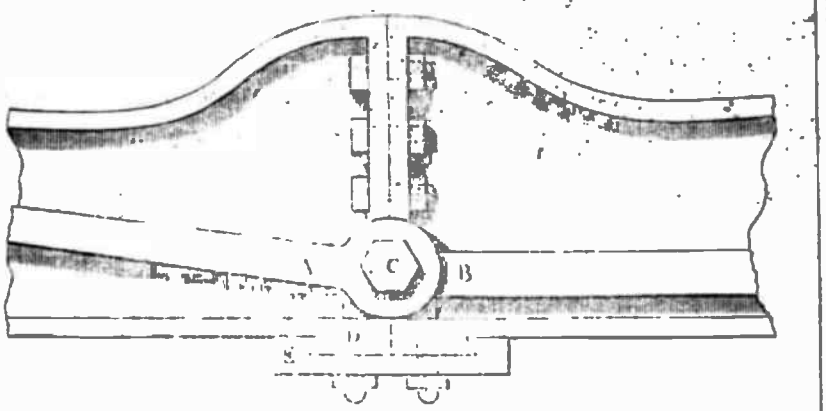
JUNCTION OF BEAM-CASTINGS IN BRIDGE AT YORK.



THE BRIDGE FAILURE AT CHESTER.

The above figure is from a pencil jotting of the manner of uniting together the three castings, forming each beam of the railway bridge over the river Ouse at York, referred to by General Pasley in his evidence (p. 262); being one of the bridges constructed with trussed beams, of the description now called in question on account of the unequal contraction and dilatation of cast and wrought iron, that evil being aggravated by the disparity of substance in the parts composed of these kinds of iron respectively. At the meeting of the tension rods, A and B, an axle, 4½ inches square, is passed through the beam, and rounded at the parts which receive the eyes of the rods; into the ends of this, the bolts, C, are screwed. There are tension-rods on both sides of the beam; also staples, D, which are notted underneath the clip, E. The clips, in the case of the Chester girders, according to the particulars quoted from the *Manchester Guardian* (p. 253), were of wrought-iron.

The linear expansion of cast-iron, with an increase of one degree Fahrenheit, is, according to Roy, ·0000061700, while that of bar-iron, with the same increase, is, according to Hasslar, ·0000069844. These data enable us to ascertain what length in the one material will be necessary to produce an extent of expansion equal to that of a given length of the other, with a corresponding increment of heat. Thus (the lengths relatively being inversely proportional to the rates of expansion), supposing a given length of wrought-iron to be 100 feet, a length of cast-iron, to have an equal amount of linear expansion, would have to be,—

61700 : 100 :: 69844 : 113 $\frac{44}{100}$ feet.—*Ans.*

Seeing that the difference in the rate of expansion is so much, and considering the great disparity of substance that is usually presented in combinations of the kind referred to, supposing the parts to be adjusted to each other at a season of medium temperature, and that the tensile strength of the rods enables them not only to sustain the superior contraction to which they are subject during the cold season, but, by virtue of it, to increase the strength of the truss for the time, it is evident that they must, during the hot season, be at least in a condition to justify the opinion of General Pasley, that they are "not of great use;" if, indeed, the downward thrust of the oblique portions, from the bearings of either end, have not power enough to act to a dangerous degree to a disadvantage of the beam they were meant to assist. JAMES WYLSON.

*** The inquiry is still going on.

IMPROVEMENTS OF GREENWICH HOSPITAL. Workmen have been employed, by order of the Commissioners of Greenwich Hospital, in the demolition of the Ship Tavern, the Lord Ligonier's Head, and other buildings in Fisher-lane, Greenwich, to form improvements in the line of, and in addition to, the river frontage of Greenwich Hospital.—*Morning Post.*

Correspondence.

ARMY AND NAVY CLUB COMPETITION.

SIR,—It has been pointed out to me that my name has been associated with MM. Pornell and Smith's design for the Army and Navy Club; will you at once disabuse your readers of such an idea? All that I know of the plans, was seeing them after they were finished, and, in common with many others, expressing my concurrence with the taste which selected one of the most beautiful palaces in Europe for the model, and which for the embellishment of the metropolis, I must confess I should like to see executed.

I am Sir, &c. C. D'ORSAY.

Gore House, June 15, 1847.

BIRMINGHAM SCHOOL OF DESIGN.—The annual meeting of the subscribers and donors of the Government School of Design at Birmingham was held on Wednesday week, when the report of the honorary secretary, Mr. J. W. Unett, was read, and resolutions were passed, the accounts, shewing a balance of 417*l.* odds due to the treasurer, examined, and the prizes distributed; the first to Mr. Aaron Jennens, being one offered by the firm of Jennens and Betteridge, for the best outline from the antique (subject, the Laocoon). Mr. Thomas Lane, the high bailiff, who presided in the absence of the late president, Lord Leigh (who has now given place to the Hon. F. Gough), remarked that, when he considered how much a knowledge of art was required in the various processes of the different trades of the town—in die-sinking, engraving, brass-founding, plating, chandelier making, and japanning—all of which were mainly dependent on the fine arts, he felt surprised that the school was not more extensively supported. The town only required to be roused to a sense of the importance of the institution. The Rev. J. P. Lee observed, that no Englishman could visit the galleries of the wealthy without being proud that English art stands so high as it does: no person, he thought, could behold even the germ of art which Birmingham possesses, without being aware that English art has a high mission, which it is destined to fulfil. But he would ask them to look at the houses of the lower classes, and say how much their mental and moral cultivation must be improved by giving them a knowledge of, and a love for, art. He did not speak so much of those instructions which were given, not as an end, but as a means, but of that love for nature—that love of something higher and worthier—that power of tracing in the works of nature the beauty which is in accordance with the highest sentiments of which man's moral and intellectual constitution are capable. Let him ask the meeting whether the homes of those artisans, whose art-work was displayed around these walls, and who were mainly inmates of the manufactories, resorting to the school as a relaxation, were not more likely to be kept neatly, orderly, and comfortably, by the action of the principles which they were taught in that school?

Miscellanea.

IMPROVED METHOD OF TEMPERING TOOLS.—We learn from the *Mining Journal*, that Mr. Newton, of the Patent Office, Chancery-lane, has taken out a patent for an apparatus for hardening and tempering edge tools. For heating axes or other similar articles a heating furnace is constructed in the form of a vertical cylinder, the exterior made of sheet-iron lined with fire-brick 4 feet 8 inches in diameter, or of such outside diameter, as to give it an inside one of 4 feet and 3 feet high. In the interior of this cylinder several fire-chambers are formed, usually four; the inner wall of each fire-chamber is 18 inches long, 4 inches from front to back, and about 4 inches in depth, forming, in the whole, a circle of 3 feet 4 inches diameter; under each there are grate bars, and air is supplied through a pipe, connected with a blowing apparatus. A circular table of cast-iron, 3 feet 4 inches diameter, is made to revolve slowly on a level with the upper part of the said chambers; this table is sustained on a central shaft, which passes down through the furnace, and has its bearing in a step below it; a pulley keyed on to it serves to communicate rotary motion to the table. When the axes or other articles are to be heated, they are placed upon the table with their bits or steeled parts projecting so far over its edge as to bring them directly over the centre of the fire, and the table is kept slowly revolving during the whole time of heating: when duly heated they are ready for the process of hardening. The hardening bath consists of a circular vat of salt and water; within the tub or vat, a little above the surface of the liquid, is a wheel mounted horizontally, with a number of hooks around the periphery, upon which the axes or other articles are suspended; the height of the hooks from the surface of the liquid is such as to allow the steeled part only to be immersed; as soon as the hardening is effected, the articles are removed from the hooks, and cooled by dipping in cold water. With the best cast-steel a temperature of 510° Fahr. has been found to produce a good result in hardening in about forty-five minutes.

DRAINAGE OF HAARLEM LAKE.—We learn from a source on which we can rely, that the drainage of Haarlem Lake, in Holland, progresses satisfactorily, and that other engines, with improvements, are now constructing in Cornwall to hasten the completion of that great work. When finished, it is understood, the sewage of all the cities and great towns bordering on the lake will, by the same engines, be conveyed to and over the surface of the bed of the lake to irrigate it; so that in all human probability fifty-six thousand acres, now covered with water, and the waste land adjoining, will, within the next seven years, be furnishing corn and cattle to the Dutch and London markets—the result of science combined with practice. We learn, also, that the same parties who are engaged in this magnificent undertaking are in communication with the Egyptian government on the subject of employing similar engines to irrigate districts above the ordinary rise of the Nile, for the purpose of growing cotton, flax, &c. If Ireland was in Holland, and parts of England in Egypt, there might be some chance that both would be improved. Strange to say, there is employment for English talent and English capital abroad, whilst at home we are content to make paupers and find them with food—to know that disease and wretchedness from the want of drainage beset the poor on every side, and yet do nothing to better their condition—to know that the sewage of our cities and towns is suffered to contaminate the waters of our streams and rivers, which might be used to fertilize our lands, and thereby increase the quantity of human food. Yet with all these evils, and all this knowledge before us, we have the vanity to consider ourselves the greatest, wisest, and best nation upon the face of the earth!—*Mark Lane Express.*

ZINC.—M. Devarenne, a founder at Berlin, has received an order from Helsingford, the capital of the Grand Duchy of Finland, to cast in zinc, for the cathedral of that city, colossal statues of the twelve apostles, after those sculptured in marble by Thorwaldsen, for the church of our Lady at Copenhagen. Six of these have been cast, and are the largest works in zinc ever executed.

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